

Mud Safe CR®

Technical Data Sheet

Until now, there have been no safe alternatives to replace the use of dangerous caustics in modern mud systems and frac fluid systems. Heartland Energy Group, Ltd. recognized, developed and has introduced the world's only synthetic caustic replacement. Mud Safe CR® can be used to maintain or increase pH. Mud Safe CR® will precipitate magnesium and suppress calcium in high hardness waters. It will also reduce corrosion and neutralize acid gases such as carbon dioxide and hydrogen sulfide. Mud Safe CR® is also extremely durable in cold temperatures and is freeze-thaw stable. The risk of severe caustic based burns and the need for personal protective equipment are greatly reduced. At last, there is a safe alternative.

Mud Safe CR® is non corrosive, non hazardous, non regulated per US DOT, non regulated per Canadian TDG, and 100% biodegradable. Mud Safe CR® carries a hazardous materials index score of triple zero. Mud Safe CR® has undergone rigorous DOT testing protocols and has proven to be non-destructive and not cause irreversible alterations in human skin tissue. In a modified Draize testing procedure, Mud Safe CR® scored as a "non-skin irritant".

FEATURES AND BENEFITS:

- Effectively increases pH
- Effectively precipitates magnesium
- 100% Biodegradable
- Non-destructive on human skin tissue
- Non-skin irritant; Will not cause burns
- Metal safe formula
- Can be used in most drilling fluids
- Extremely durable in cold temperatures
- No disposal of caustic soda bags
- Neutralizes acid gases such as carbon dioxide and hydrogen sulfide
- Does not donate the sodium ion
- A great replacement for NaOH and KOH in crosslinked systems
- Excellent buffer for frac fluid systems
- Great stability performance in high temperature and high pressure fluid systems

TYPICAL PHYSICAL PROPERTIES:

<u>Appearance and Color</u>	Colorless liquid
<u>Initial Freeze Point</u>	-10°F (-23°C)
<u>Odor</u>	Odorless
<u>Solubility in Water</u>	100%
<u>Flashpoint</u>	None
<u>Biodegradability</u>	100%
<u>Specific Gravity</u>	1.32 ± .04

DIRECTIONS FOR USE:

Mud Safe CR® can be utilized to maintain high pH levels in any fluid system. Due to its liquid form, required concentrations may be slightly higher than typical forms of dry caustic. Add to fluid or water to raise pH as needed.

STORAGE AND HANDLING:

Rinse empty container with water and discard as per federal, state and local regulations.

PACKAGING:

Mud Safe CR® is shipped in 275g totes or bulk tanker trucks from the manufacturing facility. Smaller packaging quantities are available upon request.



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